Appendix A. Glossary of terms

Adipose fin – the small fin located near the tail on the backs of salmon, trout, and whitefish. This fin can be clipped off to identify a fish without impairing its ability to swim.

Alluvium - material transported and deposited by a stream or river, usually a coarse deposit composed of sand, gravel, or cobbles.

Alcove – similar to a side channel only it is not connected to the river at the upstream end during lower flows.

Anthropogenic – human-related.

Aquatic biota – organisms that live in the water.

Bank revetment – riprap or other artificial surface along a river intended to reduce bank regression.

Bedload - the sand- to boulder-sized sediment that moves downstream along the bottom of a stream or river, especially during high flows.

Benthic - pertaining to the bed of a body of water.

Bioavailable – a nutrient that is immediately available for uptake by aquatic organisms.

Braided channel - a channel that is comprised of many small channels that weave in and out.

Canopy cover – the layer of vegetation that overhangs a stream or river channel and obstructs the view to the sky.

Chironomids - any of the family (Chironomidae) of midges that lack piercing mouth parts.

Chord length – the straight line distance between the beginning and ending of a reach of stream or river.

Collectors - referring to a group of macroinvertebrates that filter fine particulate organic matter from the water.

Coleoptera - beetles

Diptera - true flies.

Ephemeroptera - mayflies

EPT ratio - the ratios of individuals in taxa from the Ephemeroptera (mayflies), Plecoptera (stoneflies), and Trichoptera (caddisflies); a measure of diversity of species in aquatic systems.

Filterer - an organism that feeds by filtering organic matter or minute organisms from a current of water that passes through some part of its system.

Fire regime – the frequency and intensity of fire in an area.

Flood plain - the area next to a stream or river that is currently or has been covered by water during high flows.

Freshet – an antiquated term for a high flow event in a stream or river.

Functional feeding group (FFG) - a classification scheme that distinguishes insect taxa that perform different functions within aquatic ecosystems with respect to processing of nutritional resources (from Merritt and Cummins, 1984).

Gallery forest - a band of trees that grows exclusively along the river channel.

Genera – a taxonomic group of any rank (species, genus).

Geographic Information System (GIS) - a computer system designed for storage, manipulation, and presentation of geographical information such as topography, elevation and geology.

Geomorphology - land and submarine relief features of the earth's surface.

Grazers - macroinvertebrates feeding on attached coarse particulate organic matter (algae, larger plants).

Groundwater flux – the volume of groundwater that enters a water body over a given amount of time.

Heavy metals – metals such as zinc, iron, copper, and lead.

Hydrology - pertaining to the circulation and distribution of water.

Hydric - pertains to soil conditions that are typically moist for much of the year.

Invasive exotic vegetation – introduced plants with vigorous growth that crowd out native plants.

Macroinvertebrates - animals without a backbone retained by a screen with interstices ranging from 1 millimeter to 0.425 millimeters.

Megaloptera – an order of aquatic insects that have wings with a folded anal area in the hind pair, and develop from predacious larvae.

Metric - a measurable biological attribute used to evaluate water quality impacts.

Montane river – a river bordered by forested slopes that flows through upland areas.

Odonata – dragonflies.

Oligochaetes - the order containing the earthworms and freshwater worms.

Outer anomalies – defects or disease on the outer surface of a fish, including lesions, disease, injury, parasites, and missing body parts.

Peak flow – the highest discharge that occurs in a stream or river; often used in context with a recurrence interval such as a 100-year peak flow. A 100-year peak flow would be the discharge that is equaled or exceeded every 100 years, on average.

Periphyton – the film of algae and associated organism that grow on the surfaces of river or stream substrate.

Plecoptera – stoneflies.

Predators - macroinvertebrates preying on other animals.

Primary productivity – the algae, bacteria, and zooplankton present in water.

Richness - a parameter describing macroinvertebrate characteristic from instream sampling, refers to total number of species present.

Riparian - the area near a water body that is characterized by wetter soils and vegetation communities that favor conditions near water.

Salmonid – the group of fishes that include salmon, trout, and whitefish.

Savannah - a landscape characterized by grasslands with scattered trees.

Scraper – a group of fish that feed by scraping periphyton off river or stream substrate.

Shredders - referring to a group of macroinvertebrates that live by feeding on coarse particulate organic matter (i.e., decomposing vascular plant tissue).

Side channel – a channel in a stream that is secondary in size to the main channel.

Sinuosity – the degree to which a stream or river wanders back and forth laterally.

Slough - an abandoned segment of the river that is still connected to the river but has little or no flow.

Stormwater - water that flows off impermeable man-made surfaces such as pavement or roofs.

Substrate – mineral or organic surfaces within a stream or river.

Succession – the change from one vegetative community type to another over time.

Taxa - a taxonomic group of any rank (species, genus).

Thalweg – the portion of a river channel that has the fastest flow.

TMDL – an abbreviation for Total Maximum Daily Load which is an evaluation initiated by the Oregon Department of Environmental Quality to determine relative degrees of pollutant loading originating from various sources in a watershed.

Transpiring – to give off oxygen.

Trichoptera – caddisflies.

Trophic – pertaining to nutrition or feeding.

Watershed – the area upstream of a point along a stream or river that encompasses the portions that contribute to downstream surface or subsurface water.

Water column – the entire depth of water in a pond, river, or stream.

Water hardness – A measure of the amount of calcium, magnesium and iron dissolved in the water. Usually given as milligrams per liter (mg/L).

Xeric – pertains to soil conditions that are dry, at least for a portion of the year.

Appendix B. Description of macroinvertebrate sampling studies

Amazon Creek

Because of Amazon Creek's high visibility, recreational use, and use for stormwater conveyance, its macroinvertebrates have been studied often. Consultants, state environmental quality agents, and students have explored its communities to varying degrees.

Aquatic Biology Associates, Inc., April 1999 (ABA, Inc. 1999)

ABA, Inc., under contract with City of Eugene, collected macroinvertebrate samples at two sites on the West Fork of Amazon Creek and one site on the upper mainstem. The sampling sites were established to monitor long-term trends in aquatic community condition as development in the surrounding basin intensifies and to conduct a baseline examination of the biotic community as it existed at the time. According to the City of Eugene, these sites have not been used for repeated monitoring.

The furthest upstream site on the West Fork (Map 12, Station 1) is located 400 meters above the Martin Street crossing. The second sampling site on the West Fork (Map 12, Station 2) is located approximately 250 meters downstream of the upstream site. The main fork Amazon Creek site (Map 12, Station 3) is located in the park approximately 150 meters below the confluence of West and East Forks.

Riffle/run habitats were sampled using a D-frame kick-net at five points at each sample site. Samples were compiled to represent one square meter of stream bottom. Sample counts and genera/species were analyzed using the Aquatic Biology Associates, Inc. multimetric bioassessment of Pacific Northwest montane streams. Researchers acknowledged the limitations of interpreting data using this index developed for higher-gradient, more forested streams. However, a multimetric biotic index for urban or valley bottom streams was not available.

Because of upstream disturbances due to development, the upper sampling point (Station 1) on the West Fork should not be interpreted as a reference site. Rapid suburbanization is occurring upstream of the sampling site within 1000 feet. Although the researchers observe that the site's habitat characteristics align it most closely with the montane river condition assumption of the multimetric bioassessment index, Site 1's macroinvertebrate community was only 44.4% of that expected from a montane site that has high habitat integrity and complexity. The researchers estimate that upper reach plateau sites, such as Site 1 in the Amazon basin, could achieve 60-70% on the index scale under undisturbed conditions.

Urban development also occurs between Station 1 and the second site on the West Fork (Station 2). Habitat complexity is severely limited at Station 2 by fine sediments despite a higher gradient and riparian cover. Interestingly, because the site exhibits characteristic montane forest habitat conditions (higher gradients, larger substrates, fewer macrophytes), tolerant macroinvertebrate taxa found lower in the basin do not thrive and because of the disturbances from surrounding land use practices, intolerant taxa characteristic of this habitat also are not found. As a result, Station 2 scored a low 46.8% when the expected rating would be between 70-80%.

The total bioassessment ranking for the site on mainstem Amazon Creek (Site 3) was 44.4% of that expected from a montane site with very high habitat integrity and complexity. Fine sediment and lack of habitat complexity are likely the dominant factors negatively affecting macroinvertebrates at this site as well.

Overall, researchers found these three Upper Amazon sampling sites to have poorer community structure than could be expected from similar undisturbed sites. The compounded effects of suburban development, including sedimentation and reduction of habitat complexity, likely played a dominant role in the observed communities.

Anderson, T., W.R. Tinniswood and P. Jepson, 1996-97 (Anderson et al. 1997)

Anderson and colleagues sampled four sites on the mainstem of Amazon Creek in the winter of 1996 and early spring of 1997. The two upstream sites (Map 12, Stations 4,5) were located upstream of the South Eugene High School and the two downstream sites (Map 12, Stations 6,7) were located by the Lane County Fairgrounds and through the commercial district by 11th Street. The four sites straddle the open concrete culvert portion of Amazon that runs through the city center.

The area sampled at each site was not reported. Samples were collected using a 500µ mesh dip net, preserved in the field, and taken to the lab for identification. Other than simple presence/absence information, macroinvertebrate population data were not summarized or reported and raw data were not available. No comparative statistics between sample sites are given. Given the energy invested in sampling, cleaning, sorting and identifying aquatic insects, creating comparative statistics from the data is well worth the additional effort in terms of how a project will both build upon itself in future years and contribute to basin-wide efforts. Population indices for this project and its sites could not be included in the basin-wide overview. Fortunately, this project is the exception among the majority of macroinvertebrate sampling efforts undertaken in the MECT Study area.

From the information that is available, Chironomidae (Diptera) families were the most diverse families present at all sampling sites. Plecoptera, Coleoptera, Megaloptera, and Ephemeroptera were only found at the most upstream site. No Hydropsyche were found at any of the sample sites. Predators were the most common functional feeding group at all sites in December but decreased as a percentage of the community in April (36% in Dec./18% in April). Scrapers (22% in Dec./37% in April) and collector-filterers (4% in Dec./0% in April) were minor components of the community at all sites.

One interesting observation from this report was the lack of intolerant shredders, such as stoneflies, and the dominance of more tolerant shredders, such as chironomids, in reaches that were dominated by overhanging exotic vegetation species (e.g., reed canary grass and Armenian blackberry). From a trophic perspective, the more tolerant shredder community may serve the same role in stream nutrient cycling. Without relative percentages of populations of stoneflies to chironomids or an analysis of the differences in fecal size and nutrient content, however, this conclusion can only be considered. It is potential differences in community structure and function such as these, between the more thoroughly examined montane systems and the less studied urban, low-land systems, that need to be explored to better understand urban stream systems.

The report mentions, but does not quantitatively explore, the direct effects of water quality on the macroinvertebrate communities. Their qualitative observations indicated that the downstream macroinvertebrate communities in Amazon Creek are altered by cumulative poor habitat, nutrient resource, and water quality conditions. Even in areas where local beneficial habitat was available (e.g., riffles with little embedded sediment), communities remained simple and dominated by tolerant taxa.

<u>City of Eugene/Long Tom Watershed Council, April/Fall 2001</u>

The Amazon Creek Widening Project between Acorn Street Bridge and Oak Patch was implemented during the summer of 2001. Prior to restoration actions to widen the channel, the City of Eugene and the Long Tom Watershed Council sampled macroinvertebrate populations in April, 2001, at six sites above, below and within the restoration reach (Map 12, Stations 57-64). Post-restoration installation sampling was conducted in Fall, 2001, by Judy Li, professor at Oregon State University, at the same sites. The before samples were taken to determine pre-restoration macroinvertebrate community structure. The post-restoration activity samples were taken to monitor immediate response to the disturbance of the restoration activity.

Samples were collected using a modified version of the sampling methodology established by Woodward-Clyde consultants for Willow Creek in 1995 and were sorted, identified and counted by Aquatic Biology Associates, Inc.

Community data collected prior to restoration work indicates a highly tolerant community consisting primarily of Chironomids, a few Odonata, aquatic worms, and other non-insect aquatic taxa. Very few less-tolerant taxa such as Ephemeroptera, Plecoptera, or Trichoptera were observed.

Bi-annual sample collection and analysis is funded through Spring, 2003. Spring, 2002, samples were collected this April (personal communication, C. Thieman).

<u>Rachel Carson Natural Resource Program, Spring 1999-2002</u>

High school students participating in the watershed resources learning program at the Rachel Carson Center for Natural Resources at Churchill High School have been sampling macroinvertebrates from four sites on Amazon creek since 1999. Sites are located near the West Amazon Parkway (called Headwaters), in Amazon Park, near Acorn Park and Oak St. (called Quaker St.), and near Fern Ridge (called Tailwaters). Every two weeks from January to May, a team of students samples at least one of the four sites. Students collect the insects with nets and sort and identify them in the field to the order level. After counting the insects, they assign them to different groups based on a DEQ-approved Pollution Tolerance Index developed by the Saturday Academy's Student Watershed Research Project.

Willow Creek

City of Eugene/Woodward-Clyde Consultants, 1996 (City of Eugene and Woodward-Clyde Consultants 1996)

Willow Creek presents an interesting and important macroinvertebrate habitat within the MECT Study area. Its summer-dry streams, wetlands, and beaver ponds require unique life history responses from its macroinvertebrate community that distinguishes this community from other macroinvertebrate communities in other MECT Study area habitats.

The City of Eugene and Woodward-Clyde initiated this project to establish the baseline status of the macroinvertebrate communities to use as a comparative measure for future responses to urbanization and/or restoration activities. The researchers established eight sample sites within the Willow Creek basin (Map 12, Stations 20-27). Five of the sites were riffle habitats and three were shallow run habitats. Sampling occurred in early March which, though earlier than other spring sampling efforts in the Study area, is an appropriate spring sampling period for the voltinism patterns of Willow Creek's insect community and its habitats.

Community metric responses, including taxon richness, HBI (Hilsenhoff Biotic Index), and various functional feeder group (FFG) or other genera, to family ratios were presented. The HBI results at each sampling site within Willow Creek indicate that, generally, communities at each sampling point became less sensitive/more tolerant of pollution in a downstream direction. The EPT:Chironomidae ratio, which describes the balance between more sensitive Ephemeroptera, Plecoptera, and Trichoptera populations with less sensitive Chironomidae populations, decreased in a downstream direction. The change in this index either was a sign that numbers of Ephemeroptera, Plecoptera, and Trichoptera were decreasing *or* that populations of Chironomids were increasing while the EPT cohort remained constant.

Cary Kerst, 1995-2000

Stemming from a personal interest in the natural history of summer dry streams, Mr. Kerst has collected, identified, and documented adult taxa found during spring, summer and fall in the Willow Creek basin on 5 sites (Map 12, Stations 28, 30-32, 35). In 1995, he installed emergence traps at Reynolds Drive, Rathbone Lane, and just above 18th street on the West Fork. The traps were checked every few days to a week from 3/28/95 until 11/26/95. In 1996, Mr. Kerst installed traps at Reynolds Drive, on the ridge above Simmons Farm (East Fork of the West Fork, since purchased by The Nature Conservancy), another lower site at this farm, Rathbone Lane, a site just across from Hynix Semiconductor, a site above 18th Street on the East Fork, and a pond on the East Fork. These traps were checked from 2/12/96 to 10/27/96. Since 1996, Mr. Kerst has primarily netted adults to add to the list during collecting trips. The most recent list is in Appendix C.

Communication should be encouraged among other naturalists in the basin who may be collecting aquatic insects, either as adults or nymphs/larvae, to foster the sharing of observations. General lists could be developed. Although this information is valuable from a presence/absence perspective only in terms of monitoring, knowing that the insects are present is important. More importantly, if the sampling efforts and information are used to offer educational opportunities and to increase basin awareness of aquatic insect communities and their role reflecting the effects of urban change, great human community value can be gained.

A3 Channel

HW Project, Department of Environmental Quality (DEQ 1997)

DEQ selected the A-3 Channel that extends off Amazon Creek to implement a program of education and management activities to reduce point source and non-point source stormwater pollution. The project was designed to test the effectiveness of "place based" activities in improving the biological condition of a channel. Biological samples were linked with water quality samples that tested positive for organics and metals.

Macroinvertebrates were sampled at three points along the A-3 Channel in late spring (Map 12, Stations 38-40). At each point, four-square foot samples were collected using a traveling kick sample of the optimum habitat. The sample was subsampled in the field and organisms were identified to the family level. At least 100 organisms were identified for each sample.

Family identifications were then evaluated using the ODEQ Level 1 Macroinvertebrate Assessment. Out of a possible 30 points, all three sample sites scored either a 6 or a 7, indicating a highly impaired stream. No Ephemeroptera, Plecoptera, or Trichoptera were collected at the three sites. The dominant taxa were members of the Oligochaete family, specifically *Tubifex* worms.

Spring Creek

Aquatic Biology Associates, Inc., April 1999 (ABA, Inc. 1999)

ABA, Inc., under the direction of the City of Eugene, collected macroinvertebrate samples at one site on Spring Creek near Awbrey Park (Map 12, Station 41). The sampling site was established to assist in monitoring long-term trends in the urban aquatic community condition as development in the surrounding area intensifies and to conduct a baseline examination of the biotic community as it existed at the time. The Spring Creek site was selected to offer a comparison with the Amazon Creek sites that are "higher" in the basin and not as affected by extensive residential and industrial development and stormwater drainage.

The bioassessment score for this sample site was 30.5%. Based on the multimetric bioassessment index for montane streams, this type of lowland stream, were it not limited by surrounding urban or agricultural disturbances, would be expected to score in the range of 50-70%. Tolerant, common taxa, such as Oligochaeta and snails, dominated this site. No intolerant or cold water taxa were found.

This portion of Spring Creek dries up in the late spring, summer, and between storm events in the fall. However, observed taxa were not similar to those typically associated with seasonal streams, such as those found in Willow Creek by Woodward-Clyde (1996). Poor habitat conditions created by high amounts of fine sediment, nutrient enrichment, and lack of habitat complexity appeared to prevent these taxa from colonizing the site.

Because Spring Creek has not been sampled since its first long-term trend monitoring effort, conclusions about its current condition and how the stream may be responding to development in the Santa Clara area cannot be determined. If the MECT determined that Spring Creek warranted prioritization for monitoring, this site, as well as at least a second (to compare within system variability), should be used.

West Eugene Wetlands

Steve Gordon and Cary Kerst

A qualitative checklist was developed from three years worth of taxanomic sampling of adult dragon and damselflies in the West Eugene Wetlands. The list also includes adult dragonflies observed at other locations in the Eugene-Springfield area including Amazon Creek, Alton Baker Park, and the Springfield Mill Race. The list is in Appendix D.

Cedar Creek

McKenzie River Watershed Council, 1998-99

As part of a four-year, basin-wide sampling rotation established in 1998, the McKenzie River Watershed Council collected macroinvertebrates at two sites on Cedar Creek (Map 12, Stations 42 and off the map). A riffle site lower on Cedar Creek (within the MECT Study area boundary) was sampled in Fall, 1998 and another riffle site higher on the creek, near Cedar Flats Road, outside the study area, was sampled in Fall, 1999.

The Council has completed three out of the four planned years. The Council uses volunteers to address three objectives. The objectives are:

- To provide baseline information about biological water quality by identifying macroinvertebrate assemblages throughout the watershed and using these as indicators,
- To track long-term trends in water quality, and
- To offer local volunteers experiential learning opportunities related to watershed health concepts.

Collected samples were sent to ABA, Inc. for identification and data analysis. The Council is waiting to conduct data interpretation and summaries until all four years of sampling have been completed. At that point, a comprehensive monitoring report will be written. After this four year sampling effort, the Council hopes to use the results to supplement future monitoring at the same sites to track trends in biological indicators of water quality. Because of its broader geographic focus outside the study area boundaries and its temporal inconsistency (caused by the rotation of sampling efforts), the single site on Cedar Creek offers, alone, a limited data set for the MECT planners. However, by incorporating the larger project results and findings when they are published, the Council project offers considerable information to MECT planners in understanding macroinvertebrate community characteristics of the larger watershed that surrounds the study area.

McKenzie River

McKenzie River Watershed Council, 1998-2002

The McKenzie River Watershed Council established a four-year sampling rotation basin-wide in 1998. They have completed three out of the four years. The sampling sites within the study include one at Armitage Park, which was sampled in 2001, and a site at Harlow Camp, which was sampled in 2000 (Map 12, Stations 44-45). These will be the only samples taken at each of the sites. The Council uses volunteers to address three objectives. The objectives are:

- To provide baseline information about biological water quality by identifying macroinvertebrate assemblages throughout the watershed and using these as indicators,
- To track long-term trends in water quality, and
- To offer local volunteers experiential learning opportunities related to watershed health concepts.

Collected samples have been, and will continue to be, sent to ABA, Inc. for identification and data analysis. The Council is waiting to conduct data interpretation and summaries until all four years of sampling have been completed. At that point, a comprehensive monitoring report will be written. After this four year sampling effort, the Council hopes to use the results to supplement future monitoring at the same sites to track trends in biological indicators of water quality. Because of its broader geographic focus outside the study area boundaries and its temporal inconsistency (caused by the rotation of sampling efforts), these two sites offer, alone, a limited data set for the MECT planners. However, by incorporating the larger project results and findings when they are published, the Council project offers considerable information to MECT planners in understanding macroinvertebrate community characteristics of the larger watershed that surrounds the study area.

Willamette River

City of Eugene, 1994 – present (Kerst 2000, Kerst 1995)

Cary Kerst, environmental scientist for the City of Eugene, initiated a project in 1994 to monitor aquatic macroinvertebrate communities on the Willamette River above and below the wastewater treatment plant outfall. This long-term monitoring project constitutes some of the best macroinvertebrate data in the MECT Study area. Starting in 1994, samples were collected at 4 sites above the wastewater treatment plant outfall (between Beltline Bridge and Owosso Bridge) and 4 sites below the outfall (Map 12, Stations 46-54). Each sample covered a 0.25 m^2 area and was collected with a 250µ mesh net. In 1996, sampling methodology was adjusted to reflect ODEQ sampling criteria. Mr. Kerst began composite sampling created by combining 4-0.18 m^2

samples versus analyzing each single 0.25m^2 samples. For almost any habitat type, but particularly a large river system such as the Willamette with multiple diverse microhabitats within a single sample reach, composite sampling is an effective methodology. It increases the thoroughness of the sampling effort in terms of not only numbers but also diversity and richness. Mr. Kerst validated this assumption by collecting comparison samples between ODEQ and the initial sampling protocol. Population numbers are generally higher and more robust in the ODEQ samples.

In 1999, two additional sample sites were added in response to observations of little difference between sampling stations and yet general overall community changes within the urban area. The new stations are designed to assess possible overall urban effects. One is located near the confluence of the Middle and Coast forks of the Willamette River and the other is just downstream of the I-5 Bridge (Map 12, 55,56). Samples are taken in alternating years in spring (April) and fall (October). 1994 and 1995 samples were analyzed by Taxon Environmental Monitoring Service (Corvallis, OR). Samples since 1996 have been analyzed by Aquatic Biology Associates, Inc.

In the 1995 report, Mr. Kerst reported no clear changes in macroinvertebrate community structure below the wastewater treatment plant outfall. Populations below the outfall did exhibit lower community diversity, higher numbers of pollution tolerant taxa, and a shift toward the collector-filterer functional feeding group. However, Mr. Kerst noted that these changes could be a result of a combination of a number of environmental stressors including the treatment plant outfall, the local gravel mining operations, Beltline Road, heavy recreational use and drainage from Delta Ponds. Determining point specific pollution sources in an area extremely affected by nonpoint pollution is very difficult.

In the 2000 report, Mr. Kerst continued to explore the potential effects of the wastewater treatment outfall and added two sample sites to introduce the objective of measuring overall urban effect on Willamette River macroinvertebrate communities. Again, no measurable effect of the wastewater treatment plant outfall was observed. However, by adding two stations upstream of most direct urbanization effects to the river, Mr. Kerst was able to detect overall decreases in diversity, population density, and scraper functional feeding group representation and overall increases in collector-filterer functional feeding group representation and pollution tolerance.

Appendix C. Aquatic insects of the Willow Creek Basin

From Cary Kerst, Eugene Public Works, Wastewater Division

ODONATA

Latin Name	English Name
Aeshna californica Calvert, 1895[1]	California Darner
Aeshna umbrosa Walker, 1908[1]	Shadow Darner
Anax junius Drury, 1770	Common Green Darner
Erythemis collocata (Hagen, 1861)[5]	Western Pondhawk
Lestes congener Hagen, 1861[5]	Spotted Spreadwing
Libellula forensis Hagen, 1861[1]	Eight-Spotted Skimmer
Libellula lydia Drury, 1773[1]	Common Whitetail
Libellula quadrimaculata Linnaeus, 1758[5]	Four-Spotted Skimmer
Pachydiplax longipennis (Burmeister, 1839)[1]	Blue Dasher
Sympetrum costiferum (Hagen, 1861)[5]	Saffron-Winged Meadowhawk
Sympetrum illotum (Hagen, 1861)[1]	Cardinal Meadowhawk
Sympetrum madidum (Hagen, 1861)[1]	Red-Veined Meadowhawk
Sympetrum occidentale Bartener, 1915[1]	Western Meadowhawk
Sympetrum pallipes (Hagen, 1874)[1]	Striped Meadowhawk
Sympetrum vicinum (Hagen, 1861)[5]	Yellow-Legged Meadowhawk

1 -Identifications verified by: Dr. S. W. Dunkel
Collin County Community College
Plano, Texas

5 -Identifications verified by: Steve Valley
Albany, Oregon

EPHEMEROPTERA

Ameletus andersoni Zloty[3]
Baetis bicaudatus Dodds (?)[2]
Baetis tricaudatus Dodds, 1923 [2]

Caenis latipennis Banks[2]
Callibaetis pictus (Eaton)[2]
Callibaetie ferrugineus hageni Eaton, 1885 [2]
Procloeon venosum (Traver) (?)[2]
Paraleptophlebia debilis (Walker)[2]
Paraleptophlebia gregalis[2]
Siphlonurus occidentalis Eaton[2]

2 -Identifications verified by: Dr. W. L. Peters
Jan Peters
Center for Studies in Entomology
Florida A & M University

3 -Identification verified by: Dr. Jacek Zloty
Department of Biology
University of Calgary

PLECOPTERA

Capnia (new species)[6]
Isoperla fusca Needham & Smith[4]
Malenka perplexa (Frison)[4]
Ostrocerca dimicki (Frison)[4]
Ostrocerca foersteri[4]
Podmosta obscura (Frison)[4]
Sweltsa adamantea Surdick[4]

4 -Identifications verified by: Dr. B. C. Kondratieff
Department of Entomology
Colorado State University

6 -Currently being described by: Dr. Riley Nelson
University of Utah

TRICHOPTERA[7]

Lepidostoma cinereum (Banks) 1899
Clostoeca disjuncta (Banks) 1914
Grammotaulius bettenii Hill-Griffin 1912
Hesperophylax alaskensis (Banks) 1908
Limnephilus concolor Banks 1899
Limnephilus flavastellus Banks 1918
Limnephilus occidentalis Banks 1908
Limnephilus sitchensis (Kolenati) 1859
Pseudostenophylax edwardsi (Banks) 1920

Dolophilodes sisko (Ross) 1956
Ptilostomis ocellifera (Walker) 1852
Polycentropus crassicornis (Walker) 1852*
Rhyacophila grandis Banks 1911

7- Identifications verified by: Dave Ruiter
*Only record west of Montana as of 9/2000

MEGALOPTERA

Sialis rotunda

November 3, 2000

Appendix D. Odonata Checklist

Odonata Checklist
For the West Eugene Wetlands and Other Areas
33 total species, 28 West Eugene Wetlands species
(Cary Kerst, Steve Gordon, August 7, 2000)

WEST EUGENE WETLANDS SPECIES

Dragonflies, Suborder *Anisoptera*

Darner Family (*Aeshnidae)*

- ❑ California Darner, *Aeshna californica*
- ❑ Blue-eyed Darner, *A. multicolor*
- ❑ Paddle-tailed Darner*, A. palmata*
- ❑ Shadow Darner, *A. umbrosa*
- ❑ Common Green Darner, *Anax junius*

Skimmer Family (aka Common Skimmers) (*Libellulidae)*

- ❑ Western Pondhawk, *Erythemis collocata*
- ❑ Eight-spotted Skimmer, *Libellula forensis*
- ❑ Widow Skimmer, *L. luctuosa*
- ❑ Common Whitetail, *L. lydia*
- ❑ Twelve-spotted Skimmer, *L. pulchella*
- ❑ Four-spotted Skimmer, *L. quadrimaculata*
- ❑ Flame Skimmer, *L. saturata*
- ❑ Blue Dasher, *Pachydiplax longipennis*
- ❑ Variegated Meadowhawk*, Sympetrum corruptum*
- ❑ Saffron-winged Meadowhawk, *S. costiferum*
- ❑ Cardinal Meadowhawk, *S. illotum*
- ❑ Red-veined Meadowhawk, *S. madidum*
- ❑ Western Meadowhawk, *S. occidentale*
- ❑ Striped Meadowhawk, *S. pallipes*
- ❑ Yellow-legged Meadowhawk, *S. vicinum*
- ❑ Black Saddlebags, *Tramea lacerata*

Damselflies, Suborder *Zygoptera*

Spreadwing Family (Lestidae)

- ❑ California Spreadwing, *Archilestes californica*
- ❑ Spotted Spreadwing, *Lestes congener*
- ❑ Common Spreadwing*, L. disjunctus*

- Emerald Spreadwing, *L. dryas*

Pond Damsel Family (Coenagrionidae)

- Tule Bluet, *Enallagma carunculatum*
- Pacific Forktail, *Ischnura cervula*
- Western Forktail, *I. perparva*

SPECIES FOUND ELSEWHERE IN THE REGION:

Dragonflies

Spiketail Family, (*Cordulegasteridae*)

- Pacific Spiketail, *Cordulegaster dorsalis* (Upper Amazon Creek, Eugene, 1999 benthic study)

Cruiser Family, (*Macromiidae)*

- Western River Cruiser, *Macromia magnifica;* (7-8-00 Northview Blvd, Eugene, SCG*)*

Clubtail Family, (*Gomphidae)*

- Pacific Clubtail, G*omphus kurilis;* (7-9-00, Alton Baker Park, Eugene, SCG)
- Grappletail, *Octogomphus specularis*; (7-28-00, Frank Kinney Park, Amazon Creek, Bruce Newhouse, photographed).

Damselflies

Broad-winged Damselflies, (*Calopterygidae)*

- River Jewelwing, *Calopteryx aequabilis;* (7-7-00, Springfield Millrace, Springfield, SCG; 7-7-00, Alton Baker Canoe Canal, Eugene, CK).

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